THE THEORY OF VISION, OR VISUAL LANGUAGE,

SHEWING

The Immediate PRESENCE and PROVIDENCE of a DEITY,

VINDICATED *and* EXPLAINED.

By the AUTHOR of
ALCIPHRON, *or, The* MINUTE PHILOSOPHER.

Acts xvii. 28.
In him we live, and move, and have our being.

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THE THEORY *of* VISION, VINDICATED *and* EXPLAINED:

In Anſwer to an anonymous Writer.

I. AN ill State of Health, which permits me to apply myſelf but ſeldom and by ſhort Intervals to any kind of Studies, muſt be my Apology, Sir, for not anſwering your Letter * ſooner. This would have altogether excuſed me from a Controverſy upon Points either perſonal or purely ſpeculative, or from entring the Liſts with Declaimers, whom I leave to the Triumph of their own Paſſions. And indeed, to one of this Character, who contradicts himſelf and miſrepreſents me, what Anſwer can be made more than to deſire his Readers not to take his Word for what I ſay, but to uſe their own Eyes, read, examine, and judge for themſelves? And to their common Senſe I appeal. For ſuch a Writer, ſuch an Anſwer may ſuffice. But Argument, I allow, hath a right to be conſidered,

* *Publiſhed in the* Daily Poſt-Boy *of* September *the Ninth*, 1732, *which ſee in the* Appendix.

and, where it doth not convince, to be oppoſed with Reaſon. And being perſuaded that the *Theory of Viſion*, annexed to the *Minute Philoſopher*, affords to thinking Men, a new and unanſwerable Proof of the Exiſtence and immediate Operation of God, and the conſtant condeſcending Care of his Providence, I think my ſelf concerned, as well as I am able, to defend and explain it, at a time wherein Atheiſm hath made a greater Progreſs than ſome are willing to own, or others to believe.

II. He who conſiders, that the preſent avowed Enemies of Chriſtianity begun their Attacks againſt it, under the ſpecious Pretext of defending the Chriſtian Church and its Rights, when he obſerves the ſame Men pleading for Natural Religion, will be tempted to ſuſpect their Views, and judge of their Sincerity in one Caſe from what they have ſhewed in the other. Certainly the Notion of a watchful, active, intelligent, free Spirit, with whom we have to do, and in whom we live, and move, and have our Being, is not the moſt prevailing in the Books and Converſation, even of thoſe who are called Deiſts. Beſides, as their Schemes take effect, we may plainly perceive moral

ral Virtue and the Religion of Nature to decay, and ſee, both from Reaſon and Experience, that the deſtroying Revealed Religion, muſt end in Atheiſm or Idolatry. It muſt be owned, many Minute Philoſophers would not like at preſent to be accounted Atheiſts. But how many, twenty Years ago, would have been affronted to be thought Infidels, who would now be much more affronted to be thought Chriſtians! As it would be unjuſt to charge thoſe with Atheiſm who are not really tainted with it; ſo it will be allowed very uncharitable and imprudent, to overlook it in thoſe who are, and ſuffer ſuch Men, under ſpecious Pretexts, to ſpread their Principles, and in the Event, to play the ſame Game with Natural Religion that they have done with Revealed.

III. It muſt, without queſtion, ſhock ſome innocent Admirers of a certain plauſible Pretender to Deiſm and Natural Religion, if a Man ſhould ſay, there are ſtrong Signatures of Atheiſm and Irreligion in every Senſe, natural as well as revealed, to be found even in that admired Writer: And yet, to introduce Taſte inſtead of Duty, to make Man a neceſſary Agent, to deride a future Judg-

ment, ſeem to all intents and purpoſes Atheiſtical, or ſubverſive of all Religion whatſoever. And theſe every attentive Reader may plainly diſcover to be his Principles; although it be not always eaſy to fix a determinate Senſe on ſuch a looſe and incoherent Writer. There ſeems to be a certain way of Writing, whether good or bad, Tinſel or Sterling, Senſe or Nonſenſe, which, being ſuited to that ſize of Underſtanding that qualifies its Owners for the Minute Philoſophy, doth marvellouſly ſtrike and dazzle thoſe ingenious Men, who are by this means conducted they know not how, and they know not whither. Doubtleſs that Atheiſt who gilds and inſinuates, and, even while he inſinuates, diſclaims his Principles, is the likelieſt to ſpread them. What availeth it in the Cauſe of Virtue and Natural Religion, to acknowledge the ſtrongeſt Traces of Wiſdom and Power, throughout the Structure of the Univerſe, if this Wiſdom is not employed to obſerve, nor this Power to recompenſe our Actions, if we neither believe our ſelves accountable, nor God our Judge?

IV. All that is ſaid of a vital Principle of Order, Harmony, and Proportion; all that is ſaid of the Natural Decorum and

Fitneſs

Fitneſs of things; all that is ſaid of Taſte and Enthuſiaſm, may well conſiſt and be ſuppoſed, without a Grain even of Natural Religion, without any Notion of Law or Duty, any Belief of a Lord or Judge, or any religious Senſe of a God; the Contemplation of the Mind upon the Ideas of Beauty, and Virtue, and Order, and Fitneſs, being one thing, and a Senſe of Religion another. So long as we admit no Principle of good Actions but Natural Affection, no Reward but Natural Conſequences; ſo long as we apprehend no Judgment, harbour no Fears, and cheriſh no Hopes of a future State, but laugh at all theſe things, with the Author of the *Characteriſtics*, and thoſe whom he eſteems the liberal and poliſhed part of Mankind *; how can we be ſaid to be religious in any Senſe? Or what is here that an Atheiſt may not find his Account in, as well as a Theiſt? To what moral Purpoſe might not Fate or Nature ſerve as well as a Deity, on ſuch a Scheme? And is not this, at bottom, the Amount of all thoſe fair Pretences?

V. Certainly that Atheiſtical Men, who hold no Principles of any Religion, Natural or Revealed, are an increaſing Num-

* Characteriſtics, Vol. 3. Miſcel. 3. ch. 2.

ber, and this too among People of no deſpicable Rank, hath long ſince been expreſly acknowledged * by one who will be allowed a proper Judge, even this ſame plauſible Pretender himſelf to Deiſm and Enthuſiaſm. But if any well-meaning Perſons deluded by artful Writers in the Minute Philoſophy, or wanting the Opportunity of an unreſerved Converſation with ſome ingenious Men of that Sect, ſhould think that *Lyſicles* hath overſhot the Mark, and miſrepreſented their Principles: To be ſatisfied of the contrary, they need only caſt an eye on the *Philoſophical Diſſertation upon Death*, lately publiſhed by a Minute Philoſopher. Perhaps ſome Man of leiſure may think it worth while to trace the Progreſs and Unfolding of their Principles, down from the Writer in Defence of the *Rights of the Chriſtian Church*, to this Plain-dealer, the admirable Author upon *Death*. During which Period of Time, I think one may obſerve a laid Deſign, gradually to undermine the Belief of the Divine Attributes and Natural Religion; which Scheme runs parallel with their gradual, covert, inſincere Proceedings, in reſpect of the Goſpel.

* *Moraliſts*, Part II. Sect. III.

IV. That

VI. That Atheiſtical Principles have taken deeper root, and are farther ſpread, than moſt People are apt to imagine, will be plain to whoever conſiders, that Pantheiſm, Materialiſm, Fataliſm are nothing but Atheiſm a little diſguiſed; that the Notions of *Hobbes*, *Spinoſa*, *Leibnitz*, and *Bayle* are reliſhed and applauded; that as they who deny the Freedom and Immortality of the Soul in effect deny its Being, even ſo they do as to all Moral Effects and Natural Religion, deny the being of God, who deny him to be an Obſerver, Judge, and Rewarder of humane Actions; that the courſe of arguing purſued by Infidels leads to Atheiſm as well as Infidelity. [An inſtance of this may be ſeen in the Proceeding of the Author of a Book intituled, *A Diſcourſe of Free-thinking, occaſioned by the riſe and growth of a Sect called Free-thinkers*, who, having inſinuated his Infidelity from Mens various Pretences and Opinions concerning Revealed Religion, in like manner appears to inſinuate his Atheiſm from the differing Notions of Men concerning the Nature and Attributes of God, particularly from the Opinion of our knowing God by Analogy *, as it hath been miſunderſtood and miſinterpreted by ſome of late

* See Page 42 of the mentioned Book.

Years.

Years. Such is the ill effect of untoward Defences and Explanations of our Faith; and ſuch advantage do incautious Friends give its Enemies. If there be any modern well-meaning Writer, who (perhaps from not having conſidered the fifth Book of *Euclid*) writes much of Analogy without underſtanding it, and thereby hath ſlipped his Foot into this Snare, I wiſh him to ſlip it back again, and inſtead of cauſing Scandal to good Men, and Triumph to Atheiſts, diſcreetly explain away his firſt Senſe; and return to ſpeak of God and his Attributes in the Style of other Chriſtians, allowing that Knowledge and Wiſdom do, in the proper Senſe of the Words, belong to God, and that we have ſome Notion though infinitely inadequate of thoſe divine Attributes, yet ſtill more than a Man blind from his Birth can have of Light and Colours.] But to return, if I ſee it in their Writings, if they own it in their Converſation, if their Ideas imply it, if their Ends are not anſwered but by ſuppoſing it, if their leading Author hath pretended to demonſtrate Atheiſm, but thought fit to conceal his Demonſtration from the Public; if this was known in their Clubs, and yet that Author was nevertheleſs followed, and repreſented to the World as a Believer of Natural Religion;

gion; if theſe things are ſo, (and I know them to be ſo) ſurely what the Favourers of their Schemes would palliate, it is the Duty of others to diſplay and refute.

VII. And, although the Characters of Divinity are large and legible, throughout the whole Creation, to Men of plain Senſe and common Underſtanding; yet it muſt be conſidered, that we have other Adverſaries to oppoſe, other Proſelytes to make, Men prejudiced to falſe Syſtems and Proof againſt vulgar Arguments, who muſt be dealt with on a different foot. Conceited, metaphyſical, diſputing Men muſt be paid in another coin; we muſt ſhew that Truth and Reaſon in all Shapes are equally againſt them, except we reſolve to give them up, what they are very fond of being thought to engroſs, all Pretenſions to Philoſophy, Science, and Speculation.

VIII. Mean while thus much is evident: Thoſe good Men, who ſhall not care to employ their Thoughts on this *Theory of Viſion*, have no reaſon to find fault. They are juſt where they were, being left in full Poſſeſſion of all other Arguments for a God, none of which are weakened by this. And as for thoſe who

ſhall

ſhall be at the pains to examine and conſider this Subject, it is hoped they may be pleaſed to find, in an Age wherein ſo many Schemes of Atheiſm are reſtored or invented, a new Argument of a ſingular Nature in proof of the immediate Care and Providence of a God, preſent to our Minds, and directing our Actions: As theſe Conſiderations convince me, that I cannot employ my ſelf more uſefully than in contributing to awaken and poſſeſs Men with a thorough Senſe of the Deity inſpecting, concurring, and intereſting it ſelf in humane Actions and Affairs: So, I hope, it will not be diſagreeable to you, that in order to this, I make my Appeal to Reaſon, from your Remarks upon what I have wrote concerning Viſion; ſince Men who differ in the Means, may yet agree in the End, and in the ſame Candor and Love of Truth.

IX. By a ſenſible Object I underſtand that which is properly perceived by Senſe. Things properly perceived by Senſe are immediately perceived. Beſide Things properly and immediately perceived by any Senſe, there may be alſo other Things ſuggeſted to the Mind, by means of thoſe proper and immediate Objects. Which Things ſo ſuggeſted are not Objects

Objects of that Senſe, being in Truth only Objects of the Imagination, and originally belonging to ſome other Senſe or Faculty. Thus Sounds are the proper Object of Hearing, being properly and immediately perceived by that, and by no other Senſe. But, by the Mediation of Sounds or Words all other Things may be ſuggeſted to the Mind, and yet Things ſo ſuggeſted are not thought the Object of Hearing.

X. The peculiar Objects of each Senſe, although they are truly or ſtrictly perceived by that Senſe alone, may yet be ſuggeſted to the Imagination by ſome other Senſe. The Objects therefore of all the Senſes may become Objects of Imagination, which Faculty repreſents all ſenſible Things. A Colour therefore, which is truly perceived by Sight alone, may nevertheleſs upon hearing the Words *blue* or *red* be apprehended by the Imagination. It is in a primary and peculiar Manner the Object of Sight: In a ſecondary Manner it is the Object of Imagination: But cannot properly be ſuppoſed the Object of Hearing.

XI. The Objects of Senſe, being Things immediately perceived, are otherwiſe called

led Ideas. The Cauſe of theſe Ideas, or the Power producing them, is not the Object of Senſe, not being it ſelf perceived, but only inferred by Reaſon from its Effects, to wit, thoſe Objects or Ideas which are perceived by Senſe. From our Ideas of Senſe the Inference of Reaſon is good to a Power, Cauſe, Agent. But we may not therefore infer that our Ideas are like unto this Power, Cauſe, or active Being. On the contrary, it ſeems evident that an Idea can be only like another Idea, and that in our Ideas or immediate Objects of Senſe, there is nothing of Power, Cauſality, or Agency included.

XII. Hence it follows, that the Power or Cauſe of Ideas is not an Object of Senſe, but of Reaſon. Our Knowledge of the Cauſe is meaſured by the Effect, of the Power by our Idea. To the abſolute Nature, therefore, of outward Cauſes or Powers, we have nothing to ſay: They are no Objects of our Senſe or Perception. Whenever, therefore, the Appellation of ſenſible *Object* is uſed in a determined intelligible Senſe, it is not applied to ſignify the abſolutely exiſting outward Cauſe or Power, but the Ideas themſelves produced thereby.

XIII. Ideas,

XIII. Ideas, which are obſerved to be connected together, are vulgarly conſidered under the Relation of Cauſe and Effect, whereas, in ſtrict and philoſophic Truth, they are only related as the Sign to the Thing ſignified. For we know our Ideas; and therefore know that one Idea cannot be the Cauſe of another. We know that our Ideas of Senſe are not the Cauſe of themſelves. We know alſo that we do not cauſe them. Hence we know they muſt have ſome other efficient Cauſe diſtinct from them and us.

XIV. In treating of Viſion, it was my Purpoſe to conſider the Effects and Appearances, the Objects perceived by my Senſes, the Ideas of Sight as connected with thoſe of Touch; to inquire how one Idea comes to ſuggeſt another belonging to a different Senſe, how Things viſible ſuggeſt Things tangible, how preſent Things ſuggeſt Things remote and future, whether by Likeneſs, by neceſſary Connexion, by Geometrical Inference, or by arbitrary Inſtitution.

XV. It hath indeed been a prevailing Opinion and undoubted Principle among Mathematicians and Philoſophers, that there

there were certain Ideas common to both Senſes: Whence aroſe the Diſtinction of primary and ſecondary Qualities. But I think it hath been demonſtrated that there is no ſuch Thing as a common Object, as an Idea, or kind of Idea perceived both by Sight and Touch *.

XVI. In order to treat with due Exactneſs on the Nature of Viſion, it is neceſſary in the firſt place acccurately to conſider our own Ideas: To diſtinguiſh where there is a Difference: To call Things by their right Names: To define Terms, and not confound our ſelves and others by their ambiguous Uſe: The want or neglect whereof hath ſo often produced Miſtakes. Hence it is, that Men talk as if one Idea was the efficient Cauſe of another: Hence they miſtake Inferences of Reaſon for Perceptions of Senſe: Hence they confound the Power reſiding in ſomewhat external with the proper Object of Senſe, which is in Truth no more than our own Idea.

XVII. When we have well underſtood and conſidered the Nature of Viſion, we may, by reaſoning from thence, be better

* Theory of Viſion, Sect. CXXVII. & ſeq.

able

able to collect ſome Knowledge of the external unſeen Cauſe of our Ideas, whether it be one or many, intelligent or unintelligent, active or inert, Body or Spirit. But, in order to underſtand and comprehend this Theory, and diſcover the true Principles thereof, we ſhould conſider, the likelieſt way is not to attend to unknown Subſtances, external Cauſes, Agents or Powers, nor to reaſon or infer any thing about or from Things obſcure, unperceived, and altogether unknown.

XVIII. As in this Inquiry we are concerned with what Objects we perceive, or our own Ideas, ſo upon them our Reaſonings muſt proceed. To treat of Things utterly unknown as if we knew them, and ſo lay our Beginning in Obſcurity, would not ſurely ſeem the propereſt Means for the diſcovering of Truth. Hence it follows that it would be wrong, if one about to treat of the Nature of Viſion, ſhould, inſtead of attending to viſible Ideas, define the Object of Sight to be that obſcure Cauſe, that inviſible Power or Agent, which produced viſible Ideas in our Minds. Certainly, ſuch Cauſe or Power doth not ſeem to be the Object, either of the Senſe or the Science of Viſion, inaſmuch as what we know thereby we

know only of the Effects. Having premiſed thus much, I now proceed to conſider the Principles laid down in your Letter, which I ſhall take in order as they lie.

XIX. In your firſt Paragraph or Section you ſay that, "Whatever it is without which is the Cauſe of any Idea within, you call the Object of Senſe." And you tell us ſoon after this, * "That we cannot poſſibly have an Idea of any Object without." Hence it follows, that by an Object of Senſe you mean ſomething, that we can have no manner of Idea of. This making the Objects of Senſe to be Things utterly inſenſible, or unperceivable, ſeems to me contrary to common Senſe, and the Uſe of Language. That there is nothing in the Reaſon of Things to juſtify ſuch a Definition, is, I think, plain from what hath been premiſed †: and that it is contrary to received Cuſtom and Opinion, I appeal to the Experience of the firſt Man you meet, who, I ſuppoſe, will tell you that by an Object of Senſe he means that which is perceived by Senſe, and not a Thing ut-

* Sect. IV.
† Supra Sect. IX. XI. XII.

terly

terly unperceivable and unknown. The Beings, Subſtances, Powers which exiſt without, may indeed concern a Treatiſe on ſome other Science, and may there become a proper Subject of Inquiry. But, why they ſhould be conſidered as Objects of the viſive Faculty in a Treatiſe of Optics, I do not comprehend.

XX. The real Objects of Sight we ſee, and what we ſee we know. And theſe true Objects of Senſe and Knowledge, to wit our own Ideas, are to be conſidered, compared, diſtinguiſhed in order to underſtand the true Theory of Viſion. As to the outward Cauſe of theſe Ideas, whether it be one and the ſame, or various and manifold, whether it be thinking or unthinking, Spirit or Body, or whatever elſe we conceive or determine about it, the viſible Appearances do not alter their Nature, our Ideas are ſtill the ſame. Though I may have an erroneous Notion of the Cauſe, or though I may be utterly ignorant of its Nature; yet this doth not hinder my making true and certain Judgments about my Ideas: my knowing which are the ſame and which different: wherein they agree, and wherein they diſagree: which are connected together, and wherein this Connexion conſiſts: whether

it be founded in a Likeneſs of Nature, in a Geometrical Neceſſity, or merely in Experience and Cuſtom.

XXI. In your ſecond Section, you ſay, "That if we had but one Senſe, we "might be apt to conclude there were no "Objects at all without us: But that, "ſince the ſame Object is the Cauſe of "Ideas by different Senſes, thence we in-"fer its Exiſtence." Now in the firſt place, I obſerve, that I am at a Loſs concerning the Point which is here aſſumed, and would fain be informed how we come to know, that the ſame Object cauſeth Ideas by different Senſes. In the next place, I muſt obſerve that, if I had only one Senſe, I ſhould nevertheleſs infer and conclude, there was ſome Cauſe without me (which you it ſeems define to be an Object) producing the Senſations or Ideas perceived by that Senſe. For, if I am conſcious that I do not cauſe them, and know that they are not the Cauſe of themſelves, both which Points ſeem very clear, it plainly follows, that there muſt be ſome other third Cauſe diſtinct from me and them.

XXII. In your third Section, you acknowledge with me, "That the Con-

"nexion

" nexion between Ideas of different Sen-
" ſes ariſeth only from Experience." Herein we are agreed. In your fourth Section you ſay, " That a Word denot-
" ing an external Object, is the Repreſen-
" tative of no manner of Idea: Neither
" can we poſſibly have an Idea of what
" is ſolely without us." What is here ſaid of an external unknown Object, hath been already conſidered †.

XXIII. In the following Section of your Letter, you declare, " That our I-
" deas have only an arbitrary Connexion
" with outward Objects: That they are
" nothing like the outward Objects: And
" that a Variation in our Ideas doth not
" imply or infer a Change in the Objects
" which may ſtill remain the ſame." Now to ſay nothing about the confuſed Uſe of the Word Object, which hath been more than once already obſerved, I ſhall only remark that the Points aſſerted in this Section, do not ſeem to conſiſt with ſome others that follow.

XXIV. For in the ſixth Section you ſay, " That in the preſent Situation of
" Things, there is an infallible certain
" Connexion between the Idea and the

† Supra Sect. XIX.

" Object." But how can we perceive this Connexion, ſince according to you † we never perceive ſuch Object, nor can have any Idea of it? Or not perceiving it, how can we know this Connexion to be infallibly certain?

XXV. In the ſeventh Section, it is ſaid, " That we may, from our infallible Ex- " perience, argue from our Idea of one " Senſe to that of another." But, I think it is plain, that our Experience of the Connexion between Ideas of Sight and Touch is not infallible: Since, if it were, there could be no *Deceptio Viſus* neither in Painting, Perſpective, Dioptrics, nor any other wiſe.

XXVI. In the laſt Section you affirm, " That Experience plainly teaches us, " that a juſt Proportion is obſerved in " the Alteration of the Ideas of each " Senſe, from the Alteration of the Ob- " ject." Now I cannot poſſibly reconcile this Section with the fifth, or comprehend how Experience ſhould ſhew us, that the Alteration of the Object produceth a proportionable Alteration, in the Ideas of different Senſes; or how, indeed, it ſhould ſhew us any thing at all, either from or

† Letter, Sect. IV.

about

about the Alteration of an Object utterly unknown, of which we neither have nor can have any manner of Idea. What I do not perceive or know, how can I perceive, or know to be altered? And, knowing nothing of its Alterations, how can I compute any thing by them, deduce any thing from them, or be ſaid to have any Experience about them?

XXVII. From the Obſervations you have premiſed, rightly underſtood and conſidered, you ſay it follows, "That my "*New Theory of Viſion* muſt in a great "meaſure fall to the Ground; and the "Laws of Optics will be found to ſtand "upon the old unſhaken Bottom." But, though I have conſidered and endeavoured to underſtand your Remarks, yet I do not in the leaſt comprehend how this Concluſion can be inferred from them. The Reaſon you aſſign for ſuch Inference is, "Becauſe, though our Ideas in one Senſe "are intirely different from our Ideas in "another; yet we may juſtly argue from "one to the other, as they have one "common Cauſe without; of which, "you ſay, we cannot poſſibly have even "the fainteſt Idea." Now my Theory no where ſuppoſeth, that we may not juſtly argue, from the Ideas of one Senſe

to thoſe of another, by Analogy and by Experience: On the contrary, this very Point is affirmed, proved, or ſuppoſed throughout †.

XXVIII. Indeed, I do not ſee how the Inferences, which we make from viſible to tangible Ideas, include any Conſideration of one common unknown external Cauſe, or depend thereon, but only on mere Cuſtom or Habit. The Experience which I have had, that certain Ideas of one Senſe are attended or connected with certain Ideas of a different Senſe, is, I think, a ſufficient Reaſon why the one may ſuggeſt the other.

XXIX. In the next place you affirm, "That ſomething without, which is the "Cauſe of all the Variety of Ideas with-"in in one Senſe, is the Cauſe alſo of "the Variety in another: And as they "have a neceſſary Connexion with it, "we very juſtly demonſtrate from our "Ideas of Feeling, of the ſame Object, "what will be our Ideas of Seeing." As to which give me leave to remark, that to inquire whether that unknown Something be the ſame in both Caſes, or diffe-

† Theory of Viſion, Sect. XXXVIII and LXXVIII, &c.

rent,

rent, is a Point foreign to Optics; inaſmuch as our Perceptions, by the viſive Faculty, will be the very ſame, however we determine that Point. Perhaps I think, that the ſame Being which cauſeth our Ideas of Sight, doth cauſe not only our Ideas of Touch likewiſe, but alſo all our Ideas of all the other Senſes, with all the Varieties thereof. But this, I ſay, is foreign to the Purpoſe.

XXX. As to what you advance, That our Ideas have a neceſſary Connexion with ſuch Cauſe, it ſeems to me *gratis dictum*: no Reaſon is produced for this Aſſertion: and I cannot aſſent to it without a Reaſon. The Ideas or Effects, I grant, are evidently perceived: but the Cauſe, you ſay, is utterly unknown *. How, therefore, can you tell whether ſuch unknown Cauſe acts arbitrarily or neceſſarily? I ſee the Effects or Appearances: and I know that Effects muſt have a Cauſe: but I neither ſee nor know that their Connexion with that Cauſe is neceſſary. Whatever there may be, I am ſure I ſee no ſuch neceſſary Connexion, nor, conſequently, can demonſtrate by means thereof, from Ideas of one Senſe to thoſe of another.

* *Letter*, Sect. I. *and* IV.

XXXI. You

XXXI. You add, that, although to talk of ſeeing by tangible Angles and Lines be direct Nonſenſe, yet, to demonſtrate from Angles and Lines in Feeling, to the Ideas in Seeing that ariſe from the ſame common Object, is very good Senſe. If by this no more is meant, than that Men might argue and compute geometrically by Lines and Angles in Optics, it is ſo far from carrying in it any Oppoſition to my Theory, that I have expreſly declared the ſame thing *. This Doctrine, as admitted by me, is indeed ſubject to certain Limitations, there being divers Caſes, wherein the Writers of Optics thought we judged by Lines and Angles, or by a ſort of Natural Geometry; with regard to which I think they were miſtaken, and I have given my Reaſons for it. And thoſe Reaſons, as they are untouched in your Letter, retain their force with me.

XXXII. I have now gone through your Reflexions, which the Concluſion intimates to have been written in haſte, and, having conſidered them with all the Attention I am maſter of, muſt now leave it to the thinking Reader to judge, whether they contain any thing that ſhould

* *Theory of Viſion*, Sect. LXXVIII.

oblige

oblige me to depart from what I have advanced in my *Theory of Viſion.* For my own part, if I were ever ſo willing, it is not on this occaſion in my power to indulge my ſelf in the honeſt Satisfaction it would be, frankly to give up a known Error, a thing ſo much more right and reputable to renounce than to defend. On the contrary, it ſhould ſeem that the Theory will ſtand ſecure. Since you agree with me, that Men do not ſee by Lines and Angles. Since I on the other hand agree with you, that we may, nevertheleſs, compute in Optics by Lines and Angles, as I have expreſly ſhewed. Since all that is ſaid in your Letter about the Object, the ſame Object, the Alteration of the Object, is quite foreign to the Theory, which conſidereth our Ideas as the Object of Senſe, and hath nothing to do with that unknown, unperceived, unintelligible thing, which you ſignify by the Word *Object* *. Certainly, the Laws of Optics will not ſtand on the old unſhaken Bottom, if it be allowed, that we do not ſee by Geometry †. If it be evident, that Explications of *Phænomena*, given by the received Theories in Optics, are inſufficient and faulty. If

* Supra, Sect. XIV. † *Letter*, Sect. VIII.

other

other Principles are found neceſſary for explaining the Nature of Viſion. If there be no Idea, nor kind of Idea common to both Senſes *, contrary to the old received univerſal Suppoſition of Optic Writers.

XXXIII. We not only impoſe on others, but often on our ſelves, by the unſteady or ambiguous uſe of Terms. One would imagine that an Object ſhould be perceived. I muſt own when that Word is employed in a different Senſe, that I am at a loſs for its meaning, and conſequently cannot comprehend any Arguments or Concluſions about it: And I am not ſure that, on my own part, ſome Inaccuracy of Expreſſion, as well as the peculiar Nature of the Subject, not always eaſy either to explain or to conceive, may not have rendered my Treatiſe concerning Viſion difficult to a curſory Reader. But, to one of due Attention, and who makes my Words an occaſion of his own Thinking, I conceive the whole to be very intelligible. And when it is rightly underſtood, I ſcarce doubt but it will be aſſented to. One thing, at leaſt, I can affirm, that, if I am miſtaken, I

* *Theory of Viſion*, Sect. CXXVII.

can

can plead neither Haſte nor Inattention, having taken true Pains and much Thought about it.

XXXIV. And had you, Sir, thought it worth while to have dwelt more particularly on the Subject, to have pointed out diſtinct Paſſages in my Treatiſe, to have anſwered any of my Objections to the received Notions, refuted any of my Arguments in behalf of mine, or made a particular Application of your own; I might without doubt have profited by your Reflexions. But it ſeems to me, we have been conſidering, either different things, or elſe the ſame things in ſuch different Views as the one can caſt no Light on the other. I ſhall, nevertheleſs, take this Opportunity to make a Review of my Theory, in order to render it more eaſy and clear; and the rather becauſe, as I had applied myſelf betimes to this Subject, it became familiar: And, in treating of things familiar to our ſelves, we are too apt to think them ſo to others.

XXXV. It ſeemed proper, if not unavoidable, to begin in the accuſtomed Style of Optic Writers, admitting divers things as true, which in a rigorous Senſe

Senſe are not ſuch, but only received by the Vulgar and admitted for ſuch. There hath been a long and cloſe Connexion in our Minds, between the Ideas of Sight and Touch. Hence they are conſidered as one thing: Which Prejudice ſuiteth well enough with the Purpoſes of Life: and Language is ſuited to this Prejudice. The Work of Science and Speculation, is to unravel our Prejudices and Miſtakes, untwiſting the cloſeſt Connexions, diſtinguiſhing things that are different, inſtead of confuſed and perplexed, giving us diſtinct Views, gradually correcting our Judgment, and reducing it to a Philoſophical Exactneſs. And, as this Work is the Work of Time, and done by degrees, it is extremely difficult, if at all poſſible, to eſcape the Snares of popular Language, and the being betrayed thereby to ſay things, ſtrictly ſpeaking, neither true nor conſiſtent. This makes Thought and Candor more eſpecially neceſſary in the Reader. For, Language being accommodated to the Prænotions of Men and Uſe of Life, it is difficult to expreſs therein the preciſe Truth of Things, which is ſo diſtant from their Uſe, and ſo contrary to our Prænotions.

XXXVI. In the Contrivance of Viſion, as in that of other things, the Wiſdom of Providence ſeemeth to have conſulted the Operation, rather than the Theory, of Man; to the former Things are admirably fitted, but, by that very means, the latter is often perplexed. For, as uſeful as theſe immediate Suggeſtions and conſtant Connexions are to direct our Actions; ſo is our diſtinguiſhing between things confounded, and our ſeparating things connected, and as it were blended together, no leſs neceſſary to the Speculation and Knowledge of Truth.

XXXVII. The Knowledge of theſe Connexions, Relations, and Differences of things viſible and tangible, their Nature, Force, and Significancy hath not been duly conſidered by former Writers in Optics, and ſeems to have been the great *Deſideratum* in that Science, which for want thereof was confuſed and imperfect. A Treatiſe, therefore, of this Philoſophical Kind, for the underſtanding of Viſion, is at leaſt as neceſſary as the Phyſical Conſideration of the Eye, Nerve, Coats, Humours, Refractions, bodily Nature, and Motion of Light, or the Geometrical Application of Lines and Angles for *Praxis* or Theory in Dioptric Glaſſes and Mir-

Mirrours, for computing and reducing to ſome Rule and Meaſure our Judgments, ſo far as they are proportional to the Objects of Geometry. In theſe three Lights Viſion ſhould be conſidered, in order to a compleat Theory of Optics.

XXXVIII. It is to be noted, That, in conſidering the Theory of Viſion, I obſerved a certain known Method, wherein, from falſe and popular Suppoſitions, Men do often arrive at Truth. Whereas in the ſynthetical Method of delivering Science or Truth already found, we proceed in an inverted Order, the Concluſions in the Analyſis being aſſumed as Principles in the Syntheſis. I ſhall therefore now begin with that Concluſion, That *Viſion is the Language of the Author of Nature*, from thence deducing Theoremes and Solutions of Phænomena, and explaining the Nature of viſible Things, and the viſive Faculty.

XXXIX. Ideas, which are obſerved to be connected with other Ideas, come to be conſidered as Signs, by means whereof Things, not actually perceived by Senſe, are ſignified or ſuggeſted to the Imagination, whoſe Objects they are, and which alone perceives them. And as Sounds ſuggeſt

ſuggeſt other things, ſo Characters ſuggeſt thoſe Sounds; and, in general, all Signs ſuggeſt the things ſignified, there being no Idea which may not offer to the Mind another Idea, which hath been frequently joined with it. In certain Caſes, a Sign may ſuggeſt its Correlate as an Image, in others as an Effect, in others as a Cauſe. But where there is no ſuch Relation of Similitude or Cauſality, nor any neceſſary Connexion whatſoever, two things by their mere Coexiſtence, or two Ideas, merely by being perceived together may ſuggeſt or ſignify one the other, their Connexion being all the while arbitrary; for it is the Connexion only, as ſuch, that cauſeth this Effect.

XL. A great Number of arbitrary Signs, various and appoſite, do conſtitute a Language. If ſuch arbitrary Connexion be inſtituted by Men, it is an artificial Language; if by the Author of Nature, it is a Natural Language. Infinitely various are the Modifications of Light and Sound, whence they are each capable of ſupplying an endleſs Variety of Signs, and, accordingly, have been each employed to form Languages; the one by the arbitrary Appointment of Mankind, the

other by that of God himſelf*. A Connexion eſtabliſhed by the Author of Nature, in the ordinary courſe of things, may ſurely be called Natural; as that made by Men will be named Artificial. And yet this doth not hinder but the one may be as arbitrary as the other. And, in Fact, there is no more Likeneſs to exhibit, or Neceſſity to infer, things tangible from the Modifications of Light, than there is in Language, to collect the Meaning from the Sound †. But, ſuch as the Connexion is of the various Tones and Articulations of Voice with their ſeveral Meanings, the ſame is it between the various Modes of Light and their reſpective Correlates; or in other Words, between the Ideas of Sight and Touch.

XLI. As to Light, and its ſeveral Modes or Colours, all thinking Men are agreed, that they are Ideas peculiar only to Sight; neither common to the Touch, nor of the ſame Kind with any that are perceived by that Senſe. But herein lies the Miſtake, that beſide theſe,

* Minute Philoſopher, Dial. IV. Sect. VII. XI.

† Theory of Viſion, Sect. CXLIV, and CXLVII.

there

there are ſuppoſed other Ideas common to both Senſes, being equally perceived by Sight and Touch, ſuch as Extenſion, Size, Figure, and Motion. But that there are in reality no ſuch common Ideas, and that the Objects of Sight, marked by thoſe Words, are intirely different and heterogeneous from whatever is the Object of Feeling, marked by the ſame Names, hath been proved in the *Theory* *, and ſeems by you admitted. Though I cannot conceive how you ſhould in reaſon admit this, and at the ſame time contend for the received Theories, which are as much ruined, as mine is eſtabliſhed, by this main Part and Pillar thereof.

XLII. To perceive is one thing; to judge is another. So likewiſe to be ſuggeſted is one thing, and to be inferred another. Things are ſuggeſted and perceived by Senſe. We make Judgments and Inferences by the Underſtanding. What we immediately and properly perceive by Sight, is its primary Object, Light and Colours. What is ſuggeſted or perceived by Mediation thereof, are

* Theory of Viſion, Sect. CXXVII.

tangible Ideas, which may be conſidered as ſecondary and improper Objects of Sight. We infer Cauſes from Effects, Effects from Cauſes, and Properties one from another, where the Connection is neceſſary. But, how comes it to paſs, that we apprehend by the Ideas of Sight certain other Ideas, which neither reſemble them, nor cauſe them, nor are cauſed by them, nor have any neceſſary Connexion with them? The Solution of this Problem, in its full Extent, doth comprehend the whole Theory of Viſion. Thus ſtating of the Matter placeth it on a new Foot, and in a different Light from all preceding Theories.

XLIII. To explain how the Mind or Soul of Man ſimply ſees, is one thing, and belongs to Philoſophy. To conſider Particles as moving in certain Lines, Rays of Light as refracted, or reflected, or croſſing, or including Angles, is quite another thing, and appertaineth to Geometry. To account for the Senſe of Viſion by the Mechaniſm of the Eye, is a third thing, which appertaineth to Anatomy and Experiments. Theſe two latter Speculations are of uſe in Practice, to aſſiſt the Defects, and remedy the Diſtempers

Diſtempers of Sight, agreeably to the natural Laws obtaining in this mundane Syſtem. But the former Theory is that which makes us underſtand the true Nature of Viſion, conſidered as a Faculty of the Soul. Which Theory, as I have already obſerved, may be reduced to this ſimple Queſtion, to wit, How comes it to paſs, that a Set of Ideas, altogether different from tangible Ideas, ſhould nevertheleſs ſuggeſt them to us, there being no neceſſary Connexion between them? To which the proper Anſwer is, That this is done in virtue of an arbitrary Connexion, inſtituted by the Author of Nature.

XLIV. The proper immediate Object of Viſion is Light, in all its Modes and Variations, various Colours in Kind, in Degree, in Quantity; ſome lively, others faint; more of ſome, and leſs of others; various in their Bounds or Limits; various in their Order and Situation. A blind Man, when firſt made to ſee, might perceive theſe Objects, in which there is an endleſs Variety; but he would neither perceive nor imagine any Reſemblance or Connexion, between

theſe viſible Objects and thoſe perceived by Feeling *. Lights, Shades, and Colours would ſuggeſt nothing to him about Bodies hard or ſoft, rough or ſmooth: Nor would their Quantities, Limits, or Order, ſuggeſt to him Geometrical Figures, or Extenſion, or Situation, which they muſt do upon the received Suppoſition, That theſe Objects are common to Sight and Touch.

XLV. All the various Sorts, Combinations, Quantities, Degrees, and Diſpoſitions of Light and Colours, would, upon the firſt Perception thereof, be conſidered in themſelves only, as a new Set of Senſations or Ideas. As they are wholly new and unknown, a Man born blind would not, at firſt Sight, give them the Names of things formerly known and perceived by his Touch. But, after ſome Experience, he would perceive their Connexion with tangible things, and would, therefore, conſider them as Signs, and give them (as is uſual in other Caſes) the ſame Names with the things ſignified.

* Theory of Viſion, Sect. XLI. and CVI.

XLVI. More

XLVI. More and leſs, greater and ſmaller, Extent, Proportion, Interval, are all found in Time, as in Space; but it will not therefore follow, that theſe are homogeneous Quantities. No more will it follow from the Attribution of common Names, that viſible Ideas are homogeneous with thoſe of Feeling. It is true, that Terms denoting tangible Extenſion, Figure, Location, Motion, and the like, are alſo applied to denote the Quantity, Relation, and Order of the proper viſible Objects or Ideas of Sight. But this proceeds only from Experience and Analogy. There is a *Higher* and *Lower* in the Notes of Muſic. Men ſpeak in a high or a low Key. And this, it is plain, is no more than Metaphor or Analogy. So likewiſe to expreſs the Order of viſible Ideas, the Words *Situation*, *High* and *Low*, *Up* and *Down*, are made uſe of, and their Senſe, when ſo applied, is analogical.

XLVII. But in the Caſe of Viſion, we do not reſt in a ſuppoſed Analogy between different and heterogeneous Natures. We ſuppoſe an Identity of Nature, or one and the ſame Object com-

mon to both Senſes. And this Miſtake we are led into; foraſmuch as the various Motions of the Head, upward and downward, to the right and to the left, being attended with a Diverſity in the viſible Ideas, it cometh to paſs, that thoſe Motions and Situations of the Head, which in truth are tangible, do confer their own Attributes and Appellations on viſible Ideas, wherewith they are connected, and which by that means come to be termed High and Low, Right and Left, and to be marked by other Names betokening the Modes of Poſition *; which, antecedently to ſuch experienced Connexion, would not have been attributed to them, at leaſt not in the primary and literal Senſe.

XLVIII. From hence we may ſee, how the Mind is enabled to diſcern by Sight the Situation of diſtant Objects. Thoſe immediate Objects, whoſe mutual Reſpect and Order come to be expreſſed by Terms relative to tangible Place, being connected with the real Objects of Touch, What we ſay and

* Theory of Viſion, Sect. XCIX.

judge

judge of the one, we ſay and judge of the other, transferring our Thought or Apprehenſion from the Signs to the Things ſignified: As it is uſual, in hearing or reading a Diſcourſe, to overlook the Sounds or Letters, and inſtantly paſs on to the Meaning *.

XLIX. But there is a great Difficulty relating to the Situation of Objects, as perceived by Sight. For ſince the Pencils of Rays iſſuing from any luminous Object do, after their Paſſage through the Pupil and their Refraction by the cryſtalline, delineate inverted Pictures in the *Retina*, which Pictures are the immediate proper Objects of Sight, how comes it to paſs, that the Objects whereof the Pictures are thus inverted, do yet ſeem erect and in their natural Situation? For the Objects not being perceived otherwiſe than by their Pictures, it ſhould follow, that as theſe are inverted, thoſe ſhould ſeem ſo too. But this Difficulty, which is inexplicable on all the received Principles and Theories, admits of a moſt natural Solution, if it be conſidered, that the *Retina*, Cryſtalline, Pupil, Rays croſ-

* Min. Phil. Dial. IV. Sect. XII.

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ſing refracted and reunited in diſtinct Images, correſpondent and ſimilar to the outward Objects, are Things altogether of a tangible Nature.

L. The Pictures, ſo called, being formed by the radious Pencils after their abovementioned Croſſing and Refraction are not ſo truly Pictures as Images or Figures or Projections, tangible Figures projected by tangible Rays on a tangible *Retina*, which are ſo far from being the proper Objects of Sight, that they are not at all perceived thereby, being by Nature altogether of the tangible Kind, and apprehended by the Imagination alone, when we ſuppoſe them actually taken in by the Eye. Theſe tangible Images on the *Retina* have ſome Reſemblance unto the tangible Objects from which the Rays go forth; and in reſpect of thoſe Objects I grant they are inverted. But then I deny, that they are, or can be, the proper immediate Objects of Sight. This indeed is vulgarly ſuppoſed by the Writers of Optics: but it is a vulgar Error: Which being removed, the forementioned Difficulty is removed with it, and admits a juſt and full Solution, being ſhewn to ariſe from a Miſtake.

LI.

LI. Pictures therefore may be underſtood in a twofold Senſe, or as two Kinds quite diſſimilar and heterogeneous, the one conſiſting of Light, Shade, and Colours; the other, not properly Pictures, but Images projected on the *Retina*. Accordingly for Diſtinction I ſhall call thoſe *Pictures* and theſe *Images*. The former are viſible and the peculiar Objects of Sight. The latter are ſo far otherwiſe, that a Man blind from his Birth may perfectly imagine, underſtand, and comprehend them. And here it may not be amiſs to obſerve, that Figures and Motions, which cannot be actually felt by us, but only imagined, may nevertheleſs be eſteemed tangible Ideas, foraſmuch as they are of the ſame Kind with the Objects of Touch, and as the Imagination drew them from that Senſe.

LII. Throughout this whole Affair, the Mind is wonderfully apt to be deluded by the ſuddain Suggeſtions of Fancy, which it confounds with the Perceptions of Senſe, and is prone to miſtake a cloſe and habitual Connexion between the moſt diſtinct and different Things for an Identity of Nature †. The Solution

† Theory of Viſion, Sect. CXLIV.

of

of this Knot about inverted Images ſeems the principal Point in the whole Optic Theory, the moſt difficult perhaps to comprehend but the moſt deſerving of our Attention, and, when rightly underſtood, the ſureſt way to lead the Mind into a thorough Knowledge of the true Nature of Viſion.

LIII. It is to be noted of thoſe inverted Images on the *Retina*, that, although they are in Kind altogether different from the proper Objects of Sight or Pictures, they may nevertheleſs be proportional to them; as indeed the moſt different and heterogeneous Things in Nature may, for all that, have Analogy, and be proportional each to other. And although thoſe Images, when the Diſtance is given, ſhould be ſimply as the radiating Surfaces; and although it be conſequently allowed, that the Pictures are in that Caſe proportional to thoſe radiating Surfaces, or the tangible real Magnitude of Things; yet it will not thence follow, that in common Sight we perceive or judge of thoſe tangible real Magnitudes, ſimply by the viſible Magnitudes of the Pictures; for therein the Diſtance is not given, tangible Objects being

being placed at various Diſtances: And the Diameters of the Images, to which Images the Pictures are proportional, are inverſly as thoſe Diſtances, which Diſtances are not immediately perceived by Sight †. And admitting they were, it is nevertheleſs certain, that the Mind, in apprehending the Magnitudes of tangible Objects by Sight, doth not compute them, by means of the inverſe Proportion of the Diſtances and the direct Proportion of the Pictures. That no ſuch Inference or Reaſoning attends the common Act of Seeing, every one's Experience may inform him.

LIV. To know how we perceive or apprehend by Sight the real Magnitude of tangible Objects, we muſt conſider the immediate viſible Objects, and their Properties or Accidents. Theſe immediate Objects are the Pictures. Theſe Pictures are ſome more lively, others more faint. Some are higher, others are lower in their own Order, or peculiar Location, which, though in truth quite diſtinct, and altogether different from that of tangible Objects, hath nevertheleſs a Relation and

† Theory of Viſion, Sect. II.

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Connexion with it, and thence comes to be ſignified by the ſame Terms, *high*, *low*, and ſo forth. Now by the Greatneſs of the Pictures, their Faintneſs, and their Situation we perceive the Magnitude of tangible Objects. The greater, the fainter, and the upper Pictures ſuggeſting the greater tangible Magnitude.

LV. For the better Explication of this Point, we may ſuppoſe a diaphanous Plain erected near the Eye, perpendicular to the Horizon, and divided into ſmall equal Squares. A ſtraight Line from the Eye to the utmoſt Limit of the Horizon, paſſing through this diaphanous Plain, will mark a certain Point or Height to which the horizontal Plain, as projected or repreſented in the perpendicular Plain, would riſe. The Eye ſees all the Parts and Objects in the horizontal Plain, through certain correſponding Squares of the perpendicular diaphanous Plain. Thoſe that occupy moſt Squares have a greater viſible Extenſion, which is proportional to the Squares. But the tangible Magnitudes of Objects are not judged proportional thereto. For thoſe which are ſeen through the upper Squares, ſhall appear vaſtly bigger than thoſe ſeen through

through the lower Squares, though occupying the ſame, or a much greater Number of thoſe equal Squares in the diaphanous Plain.

LVI. Rays iſſuing from every Point, of each Part or Object in the horizontal Plain, through the diaphanous Plain to the Eye, do to the Imagination exhibit an Image of the horizontal Plain and all its Parts, delineated in the diaphanous Plain, and occupying the Squares thereof to a certain Height, marked out by a right Line reaching from the Eye to the fartheſt Limit of the Horizon. A Line drawn through the forementioned Height or Mark, upon the diaphanous Plain, and parallel to the Horizon, I call the Horizontal Line. Every Square contains an Image of ſome correſponding Part of the Horizontal Plain. And this intire Image we may call the Horizontal Image, and the Picture anſwering to it the Horizontal Picture. In which Repreſentation, the upper Images ſuggeſt much greater Magnitudes than the lower. And theſe Images ſuggeſting the greater Magnitudes are alſo fainter as well as upper. Whence it follows, that Faintneſs and Situation concur with viſible Magnitude to ſuggeſt tangible

gible Magnitude. For the Truth of all which I appeal to the Experience and Attention of the Reader, who ſhall add his own Reflexion to what I have written.

LVII. It is true, this diaphanous Plain, and the Images ſuppoſed to be projected thereon, are altogether of a tangible Nature *: But then there are Pictures relative to thoſe Images: and thoſe Pictures have an Order among themſelves, anſwering to the Situation of the Images, in reſpect of which Order they are ſaid to be higher and lower †. Theſe Pictures alſo are more or leſs faint, they, and not the Images, being in truth the viſible Objects. Therefore what hath been ſaid of the Images, muſt in Strictneſs be underſtood of the correſponding Pictures, whoſe Faintneſs, Situation, and Magnitude, being immediately perceived by Sight, do all three concur in ſuggeſting the Magnitude of tangible Objects, and this only by an experienced Connexion.

LVIII. The Magnitude of the Picture will perhaps be thought by ſome to have a neceſſary Connexion with that of the

* Theory of Viſion, Sect. CLVIII.
† Supra, Sect. XLVI.

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tangible Object, or, (if not confounded with it) to be at leaſt the ſole means of ſuggeſting it. But ſo far is this from being true, that of two viſible Pictures equally large, the one, being fainter and upper, ſhall ſuggeſt an hundred times greater tangible Magnitude than the other †: Which is an evident Proof, that we do not judge of the tangible Magnitude merely by the viſible: But that our Judgment or Apprehenſion is to be rated rather by other Things, which yet, not being conceived to have ſo much Reſemblance with tangible Magnitude, may therefore be overlooked.

LIX. It is farther to be obſerved, that beſide this Magnitude, Situation, and Faintneſs of the Pictures, our Prænotions concerning the Kind, Size, Shape, and Nature of Things do concur in ſuggeſting to us their tangible Magnitudes. Thus, for inſtance, a Picture equally great, equally faint, and in the very ſame Situation ſhall, in the Shape of a Man, ſuggeſt a leſſer tangible Magnitude, than it would in the Shape of a Tower.

† Theory of Viſion, Sect. LXXVIII.

LX. Where the kind Faintneſs and Situation of the horizontal Pictures † are given, the ſuggeſted tangible Magnitude will be as the Viſible. The Diſtances and Magnitudes, that we have been accuſtomed to meaſure by Experience of Touch, lying in the Horizontal Plain, it thence comes to paſs, that Situations of the Horizontal Pictures ſuggeſt the tangible Magnitudes, which are not in like manner ſuggeſted by vertical Pictures. And it is to be noted that, as an Object gradually aſcends from the Horizon towards the Zenith, our Judgment concerning its tangible Magnitude comes by Degrees, to depend more intirely on its viſible Magnitude. For the Faintneſs is leſſened as the Quantity of intercepted Air and Vapours is diminiſhed: And as the Object riſeth, the Eye of the Spectator is alſo raiſed above the Horizon: So that the two concurring Circumſtances, of Faintneſs and Horizontal Situation, ceaſing to influence the Suggeſtion of tangible Magnitude; this ſame Suggeſtion or Judgment doth in Proportion thereto, become the ſole Effect of the viſible Magnitude and the Prænotions. But it is evident, that if ſeveral Things (for inſtance,

† Supra, Sect. LVI.

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the Faintneſs, Situation, and viſible Magnitude) concur to enlarge an Idea, upon the gradual Omiſſion of ſome of thoſe Things, the Idea will be gradually leſſened. This is the Caſe of the Moon *, when ſhe aſcends above the Horizon, and gradually diminiſheth her apparent Dimenſion, as her Altitude increaſeth.

LXI. It is natural for Mathematicians, to regard the viſual Angle and the apparent Magnitude, as the ſole or principal Means of our apprehending the tangible Magnitude of Objects. But it is plain from what hath been premiſed, that our Apprehenſion is much more influenced by other Things †, which have no Similitude or neceſſary Connexion therewith.

LXII. And theſe ſame Means, which ſuggeſt the Magnitude of tangible Things, do alſo ſuggeſt their Diſtance ‡, and in the ſame Manner, that is to ſay, by Experience alone, and not by any neceſſary Connexion, or Geometrical Inference. The Faintneſs therefore, and Vividneſs, the upper and lower Situation, together with

* Theory of Viſion, Sect. LXXIII.
† Supra, Sect. LVIII.
‡ Theory of Viſion, Sect. LXXVII.

the visible Size of the Pictures, and our Prænotions concerning the Shape and Kind of tangible Objects, are the true Medium by which we apprehend the various Degrees of tangible Distance. Which follows from what hath been premised, and will indeed be evident to whoever considers, that those visual Angles, with their Arches or Subtenses, are neither perceived by Sight, nor by Experience of any other Sense. Whereas it is certain, that the Pictures, with their Magnitudes, Situations, and Degrees of Faintness are alone the proper Objects of Sight. So that, whatever is perceived by Sight, must be perceived by Means thereof. To which Perception the Prænotions also, gained by Experience of Touch or of Sight and Touch conjunctly, do contribute.

LXIII. And indeed we need only reflect on what we see, to be assured that the less the Pictures are, the fainter they are, and the higher (provided still they are beneath the Horizontal † Line or its Picture) by so much the greater, will the Distance seem to be. And this upper Situation of the Picture, is in Strictness

† Supra, Sect. LVI.

what

what muſt be underſtood when, after a popular Manner of Speech, the Eye is ſaid to perceive Fields, Lakes, and the like, interjacent † between it and the diſtant Object, the Pictures correſponding to them being only perceived to be lower than that of the Object ‡. Now it is evident, that none of theſe Things have in their own Nature any neceſſary Connexion with the various Degrees of Diſtance. It will alſo appear upon a little Reflexion, that ſundry Circumſtances of Shape, Colour, and Kind, do influence our Judgments or Apprehenſions of Diſtance: All which follows from our Prænotions, which are meerly the Effect of Experience.

LXIV. As it is natural for Mathematicians to reduce Things to the Rule and Meaſure of Geometry, they are prone to ſuppoſe that the apparent Magnitude hath a greater Share than we really find, in forming our Judgment concerning the Diſtance of Things from the Eye. And, no doubt, it would be an eaſy and ready Rule to determine the apparent Place of an Object, if we could ſay, that its Diſtance was inverſly as the Diameter of its

† Theory of Viſion, Sect. III.
‡ Supra, Sect. LV.

apparent Magnitude, and ſo judge by this alone excluſive of every other Circumſtance. But that this would be no true Rule, is evident, there being certain Caſes in Viſion, by refracted or reflected Light, wherein the Diminution of the apparent Magnitude is attended with an apparent Diminution of Diſtance.

LXV. But further to ſatisfy us that our Judgments or Apprehenſions, either of the Greatneſs or Diſtance of an Object, do not depend abſolutely on the apparent Magnitude, we need only ask the firſt Painter we meet, who, conſidering Nature rather than Geometry, well knows that ſeveral other Circumſtances contribute thereto: And ſince Art can only deceive us as it imitates Nature, we need but obſerve Pieces of Perſpective and Landſchapes, to be able to judge of this Point.

LXVI. When the Object is ſo near, that the Interval between the Pupils beareth ſome ſenſible Proportion to it, the Senſation, which attends the Turn or Straining of the Eyes, in order to unite the two Optic Axes therein, is to be conſidered as one Means of our per-

perceiving Diſtance *. It muſt be owned, this Senſation belongeth properly to the Senſe of Feeling; but as it waits upon, and hath a conſtant regular Connexion with, diſtinct Viſion of near Diſtance (the nearer This, the greater That) ſo it is natural, that it ſhould become a Sign thereof, and ſuggeſt it to the Mind †. And that it is ſo in Fact, follows from that known Experiment, of hanging up a Ring Edge-wiſe to the Eye, and then endeavouring, with one Eye ſhut, by a lateral Motion, to inſert into it the End of a Stick; which is found more difficult to perform than with both Eyes open, from the Want of this Means of judging by the Senſation attending the nearer meeting or croſſing of the two Optic Axes.

LXVII. True it is, that the Mind of Man is pleaſed to obſerve in Nature Rules or Methods, ſimple, uniform, general, and reducible to Mathematics, as a means of rendering its Knowledge at once eaſy and extenſive. But we muſt not, for the ſake of Uniformities or Analogies, depart from Truth and Fact,

* Theory of Viſion, Sect. XVI, XVII.

† Supra. Sect. XXXIX.

nor imagine that in all Caſes, the apparent Place or Diſtance of an Object muſt be ſuggeſted by the ſame Means. And, indeed, it anſwers the Ends of Viſion to ſuppoſe, that the Mind ſhould have certain additional Means or Helps, for judging more accurately of the Diſtance of thoſe Objects, which are the neareſt, and conſequently moſt concern us.

LXVIII. It is alſo to be obſerved, that when the Diſtance is ſo ſmall, that the Breadth of the Pupil bears a conſiderable Proportion to it, the Object appears confuſed. And this Confuſion being conſtantly obſerved in poring on ſuch near Objects, and increaſing as the Diſtance leſſens, becomes thereby a Means of ſuggeſting the Place of an Object *. For one Idea is qualified to ſuggeſt another, meerly by being often perceived with it. And if the one increaſeth either directly or inverſly, as the other, various Degrees of the former will ſuggeſt various Degrees of the latter, by virtue of ſuch habitual Connexion, and proportional Increaſe or Diminution. And thus, the gradual changing Confuſedneſs of an Object may concur to form our Apprehen-

* Theory of Viſion, Sect. XXI.

ſion

ſion of near Diſtance, when we look only with one Eye. And this alone may explain Dr. *Barrow*'s Difficulty, the Caſe as propoſed by him, regarding only one viſible point *. And when ſeveral Points are conſidered, or the Image ſuppoſed an extended Surface, its increaſing Confuſedneſs will, in that Caſe, concur with the increaſing Magnitude to diminiſh its Diſtance, which will be inverſly as both.

LXIX. Our Experience in Viſion is got by the naked Eye. We apprehend or judge from this ſame Experience, when we look through Glaſſes. We may not, nevertheleſs, in all Caſes, conclude from the one to the other, becauſe that certain Circumſtances either excluded or added, by the help of Glaſſes, may ſometimes alter our Judgments, particularly as they depend upon Prænotions.

LXX. What I have here written may ſerve as a Commentary on my *Eſſay towards a new Theory of Viſion*; and, I believe, will make it plain to thinking Men. In an Age wherein we hear ſo much of Thinking and Reaſoning, it may ſeem

* Theory of Viſion, Sect. XXIX.

needleſs

needleſs to obſerve, how uſeful and neceſſary it is to think, in order to obtain juſt and accurate Notions, to diſtinguiſh Things that are different, to ſpeak conſiſtently, to know even our own Meaning. And yet for want of this, we may ſee many, even in theſe Days, run into perpetual Blunders and Paralogiſms. No Friend, therefore, to Truth and Knowledge, would lay any Reſtraint or Diſcouragement on Thinking. There are, it muſt be owned, certain general Maxims, the Reſult of Ages, and the collected Senſe of thinking Perſons, which ſerve inſtead of Thinking, for a Guide or Rule to the Multitude, who, not caring to think for themſelves, it is fit they ſhould be conducted by the Thought of others. But thoſe who ſet up for themſelves, thoſe who depart from the publick Rule, or thoſe who would reduce them to it, if they do not think, what will Men think of them? As I pretend not to make any Diſcoveries which another might not as well have made, who ſhould have thought it worth his Pains: So I muſt needs ſay, that without Pains and Thought no Man will ever underſtand the true Nature of Viſion, or comprehend what I have wrote concerning it.

LXXI. Before

LXXI. Before I conclude, it may not be amiſs to add the following Extract from the *Philoſophical Tranſactions*, relating to a Perſon blind from his Infancy, and long after made to ſee: "When he "firſt ſaw, he was ſo far from making "any Judgment about Diſtances, that he "thought all Objects whatever touched "his Eyes (as he expreſſed it) as what "he felt did his Skin; and thought no "Objects ſo agreeable as thoſe which "were ſmooth and regular, though he "could form no Judgment of their "Shape, or gueſs what it was in any Ob-"ject that was pleaſing to him. He knew "not the Shape of any thing, nor any "one thing from another, however dif-"ferent in Shape or Magnitude: but up-"on being told what things were, whoſe "Form he before knew from Feeling, he "would carefully obſerve that he might "know them again: but having too "many Objects to learn at once, he for-"got many of them: And (as he ſaid) at "firſt he learned to know, and again for-"got a thouſand Things in a Day. Se-"veral Weeks after he was couched, be-"ing deceived by Pictures he asked, which "was the lying Senſe, Feeling or Seeing? "He was never able to imagine any Lines "beyond the Bounds he ſaw. The Room

"he

" he was in, he ſaid, he knew to be but " Part of the Houſe, yet he could not " conceive that the whole Houſe could " look bigger. He ſaid every new Ob- " ject was a new Delight, and the Plea- " ſure was ſo great that he wanted Ways " to expreſs it †." Thus, by Fact and Experiment thoſe Points of the Theory, which ſeem the moſt remote from common Apprehenſion, were not a little confirmed many Years after I had been led into the Diſcovery of them by Reaſoning.

F I N I S.

APPENDIX.

A Letter *from an anonymous Writer to the Author of the* Minute Philoſopher.

Reverend Sir,

I Have read over your Treatiſe called *Alciphron*, in which the Free-thinkers of the preſent Age, in their various ſhifted Tenets, are pleaſantly, elegantly and ſolidly confuted; the Style is eaſy, the Language plain, and the Arguments are nervous; but upon the Treatiſe annexed thereto, and upon that Part where you ſeem

† Phil. Tranſact. Num. 402.

ſeem to intimate that Viſion is the ſole Language of God, I beg leave to make theſe few Obſervations, and offer them to yours and your Readers Conſideration.

I. Whatever it is without that is the Cauſe of any Idea within, I call the Object of Senſe; the Senſations ariſing from ſuch Objects I call Ideas: The Objects therefore that cauſe ſuch Senſations, are without us, and the Ideas within.

II. Had we but one Senſe, we might be apt to conclude that there were no Objects at all without us, but that the whole Scene of Ideas which paſſed through the Mind, aroſe from its internal Operations; but ſince the ſame Object is the Cauſe of Ideas by different Senſes, thence we infer its Exiſtence: But though the Object be one and the ſame, the Ideas that it produces in different Senſes have no manner of Similitude with one another. Becauſe,

III. Whatever Connexion there is betwixt the Idea of one Senſe, and the Idea of another, produced by the ſame Object, ariſes only from Experience. To explain this a little familiarly; let us ſuppoſe a Man to have ſuch an exquiſite Senſe of feeling given him, that he could perceive plainly and diſtinctly the Inequality of the Surface of two Objects, which by its reflecting and refracting the Rays of Light, produces the Ideas of Colours. At firſt in

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the Dark, though he plainly perceived a Difference by his Touch, yet he could not poſſibly tell which was red and which was white, whereas a little Experience would make him feel a Colour in the Dark, as well as ſee it in the Light.

IV. The ſame Word in Languages ſtands very often for the Object without, and the Ideas it produces within, in the ſeveral Senſes. When it ſtands for any Object without, it is the Repreſentative of no manner of Idea; neither can we poſſibly have any Idea of what is ſolely without us. Becauſe,

V. Ideas within have no other Connexion with the Objects without, than from the Frame and Make of our Bodies, which is by the arbitrary Appointment of God; and though we cannot well help imagining that the Objects without are ſomething like our Ideas within, yet a new Sett of Senſes, or the Alteration of the old ones, would ſoon convince us of our Miſtake; and though our Ideas would then be never ſo different, yet the Objects might be the ſame.

VI. However, in the preſent Situation of Affairs, there is an infallible certain Connexion betwixt the Idea and the Object: And therefore, when an Object produces an Idea in one Senſe, we know, but from Experience only, what Idea it will produce in another Senſe. VI.

VII. The Alteration of an Object may produce a different Idea in one Senſe from what it did before, which may not be diſtinguiſhed by another Senſe. But where the Alteration occaſions different Ideas in different Senſes, we may from our infallible Experience argue from the Idea of one Senſe to that of the other; ſo that if a different Idea ariſes in two Senſes from the Alteration of an Object either in Situation or Diſtance, or any other way, when we have the Idea in one Senſe, we know from Uſe what Idea the Object ſo ſituated will produce in the other.

VIII. Hence as the Operations of Nature are always regular and uniform, where the ſame Alteration of the Object occaſions a ſmaller Difference in the Ideas of one Senſe, and a greater in the other, a curious Obſerver may argue as well from exact Obſervations, as if the Difference in the Ideas was equal; ſince Experience plainly teaches us, that a juſt Proportion is obſerved in the Alteration of the Ideas of each Senſe, from the Alteration of the Object. Within this Sphere is confined all the judicious Obſervations and Knowledge of Mankind: Now from theſe Obſervations rightly underſtood and conſidered, your new Theory of Viſion muſt in a great meaſure fall to the Ground, and the Laws of Opticks will be found to ſtand upon the

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old unſhaken Bottom. For though our Ideas of Magnitude and Diſtance in one Senſe are intirely different from our Ideas of Magnitude and Diſtance in another, yet we may juſtly argue from one to the other, as they have one common Cauſe without, of which, as without, we cannot poſſibly have the fainteſt Idea. The Ideas I have of Diſtance and Magnitude by Feeling, are widely different from the Ideas I have of them by Seeing; but that ſomething without, which is the Cauſe of all the Variety of the Ideas within, in one Senſe, is the Cauſe alſo of the Variety in the other; and as they have a neceſſary Connexion with it, we very juſtly demonſtrate from our Ideas of Feeling of the ſame Object, what will be our Ideas in Seeing. And though to talk of Seeing by tangible Angles and tangible Lines; be, I agree with you, direct Nonſenſe, yet to demonſtrate from Angles and Lines in Feeling, to the Ideas in Seeing that ariſe from the ſame common Object, is very good Senſe, and ſo *vice verſa*. From theſe Obſervations thus haſtily laid together, and a thorough Digeſtion thereof, a great many uſeful Corollaries in all Philoſophical Diſputes might be collected. I am,

Your humble Servant, &c.

ERRATA.

Page 40, l. ult. *after* Touch, *for* Full-Point *place* Comma;
Page 41, l. 15. *read* are ſuppoſed.